

From: Richard Rupert/R3/USEPA/US
Sent: 10/2/2012 4:06:04 PM

To: "richard.fetzer@epa.gov" <richard.fetzer@epa.gov>
CC:
Subject: Fw: Businessweek: Cabot s Methodology Links Tainted Water Wells to Gas Fracking

is this one of the articles you have seen?

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"The commander in the field is always right and the rear echelon is wrong, unless proved otherwise."
Colin Powell
----- Forwarded by Richard Rupert/R3/USEPA/US on 10/02/2012 04:05 PM -----
From: Ralph Ludwig/ADA/USEPA/US
To: Richard Rupert/R3/USEPA/US
Date: 10/02/2012 01:42 PM
Subject: Re: Businessweek: Cabot s Methodology Links Tainted Water Wells to Gas Fracking

No I haven't seen the Scranton Times story. I'll try to dig it up.
Ralph

Ralph D. Ludwig, Ph.D.
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From: Richard Rupert/R3/USEPA/US
To: Ralph Ludwig/ADA/USEPA/US@EPA
Date: 10/02/2012 11:51 AM
Subject: Re: Businessweek: Cabot s Methodology Links Tainted Water Wells to Gas Fracking

No I hadn't seen but heard it was out there. Did you see the Scranton Times story?

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From: Ralph Ludwig
To: "Richard Rupert" <rupert.richard@epa.gov>
Cc:
Date: 10/02/2012 11:39 AM CDT
Subject: Fw: Businessweek: Cabot s Methodology Links Tainted Water Wells to Gas Fracking

Hey Rich,
I assume you may have already seen this.

Ralph

----- Forwarded by Ralph Ludwig/ADA/USEPA/US on 10/02/2012 11:39 AM -----

From: David Jewett/ADA/USEPA/US

To: Ralph Ludwig/ADA/USEPA/US@EPA, Rick Wilkin/ADA/USEPA/US@EPA

Cc: Doug Beak/ADA/USEPA/US, Dominic Digiulio/ADA/USEPA/US@EPA

Date: 10/02/2012 10:44 AM

Subject: Fw: Businessweek: Cabot s Methodology Links Tainted Water Wells to Gas Fracking

Just received. Thought you might be interested.

- dgj -

----- Forwarded by David Jewett/ADA/USEPA/US on 10/02/2012 10:42 AM -----

From: Jeanne Briskin/DC/USEPA/US

To: Sonich-Mullin.Cynthia@epamail.epa.gov, Orme-Zavaleta.Jennifer@epamail.epa.gov, "David Jewett" <Jewett.David@epamail.epa.gov>, "Michael McDonald" <McDonald.Michael@epamail.epa.gov>, "Suzanne vanDrunick" <vanDrunick.Suzanne@epamail.epa.gov>, "Susan Burden" <Burden.Susan@epamail.epa.gov>, "Fred Hauchman" <Hauchman.Fred@epamail.epa.gov>, "Dayna Gibbons" <Gibbons.Dayna@epamail.epa.gov>

Date: 10/02/2012 10:39 AM

Subject: Fw: Businessweek: Cabot s Methodology Links Tainted Water Wells to Gas Fracking

Fyi

Sent by blackberry

----- Original Message -----

From: Glenn Paulson

Sent: 10/02/2012 11:25 AM EDT

To: Jeanne Briskin

Subject: Fw: Businessweek: Cabot s Methodology Links Tainted Water Wells to Gas Fracking

FYI, since you were not included on the original distribution. If generalized, the technical points about isotopic signatures, transportation over millions of years, etc. could come up in the drinking water study.

No response needed; forward as you see fit.

Glenn

----- Forwarded by Glenn Paulson/DC/USEPA/US on 10/02/2012 11:23 AM -----

From: James O'Hara/DC/USEPA/US

To: Bob Sussman/DC/USEPA/US@EPA, Glenn Paulson/DC/USEPA/US@EPA, Lek Kadeli/DC/USEPA/US@EPA, Ramona Trovato/DC/USEPA/US@EPA

Date: 10/02/2012 11:06 AM

Subject: Fw: Businessweek: Cabot s Methodology Links Tainted Water Wells to Gas Fracking

fyi

----- Forwarded by James O'Hara/DC/USEPA/US on 10/02/2012 11:05 AM -----

From: Robert Delp/DC/USEPA/US

To: Andra Belknap <belknap.andra@epa.gov>, Alisha Johnson/DC/USEPA/US@EPA, Michael Moats/DC/USEPA/US@EPA, Stephanie Epner/DC/USEPA/US@EPA, David Bloomgren/DC/USEPA/US@EPA, James O'Hara/DC/USEPA/US@EPA, Victoria Rivas-Vazquez/DC/USEPA/US@EPA

Date: 10/02/2012 10:21 AM

Subject: Businessweek: Cabot s Methodology Links Tainted Water Wells to Gas Fracking

Cabot s Methodology Links Tainted Water Wells to Gas Fracking

By Mark Drajem and Jim Efstathiou Jr. on October 02, 2012

Methane in two Pennsylvania water wells has a chemical fingerprint that links it to natural gas produced by hydraulic fracturing, evidence that such drilling can pollute drinking water.

The data, collected by the U.S. Environmental Protection Agency, are significant because the composition of the gas --its isotopic signature -- falls into a range Cabot Oil & Gas Corp. (COG) had identified as that of the Marcellus Shale, which it tapped through hydraulic fracturing, or fracking.

The EPA data falls squarely in the Marcellus space established by Cabot s scientists, said Rob Jackson, an environmental scientist at Duke University. That evidence backs up his findings linking gas drilling and water problems in the town of Dimock, applying the very methodology that Cabot established to try to debunk it, he said.

Cabot maintains that its operations haven't contaminated homeowners wells, and its scientists say further analysis shows this gas isn't from the Marcellus, a mile-deep formation running from New York to the southwestern tip of Virginia. Industry groups say there hasn't been proof of fracking contaminating water anywhere, and dispute research that suggests pumping millions of gallons of water, sand and chemicals underground to break apart rock and free trapped gas endangers the environment.

The question of the provenance of the gas in the northeastern Pennsylvania town has taken on national importance after tainted wells there were featured in the film *Gasland*. Last year, the EPA stepped in to test the water, one of only a few cases nationwide where the federal agency intervened in a dispute over fracking and water woes.

High Profile

Dimock is so important because it's so high profile, Kate Sinding, a senior attorney at the Natural Resources Defense Council in New York, said in an interview. It's been a poster child for what can happen with fracking.

In a 2010 consent order, the Pennsylvania Department of Environmental Protection found that 18 drinking-water wells in the area were affected by Cabot's drilling. The company disagreed, and applauded when the EPA cleared the water in Dimock as safe this July. State regulators ruled last month that Cabot could begin fracking seven wells in the affected area of Dimock, ending a moratorium imposed in 2010.

The latest data, which the EPA began to collect early this year, were posted on the agency's website in response to Freedom of Information Act requests from Jackson, Cabot and others. The EPA submitted the results to its researchers conducting a broader nationwide study about the effects of fracking on drinking water, agency spokesman David Bloomgren said.

Gas Production

Gas production in Pennsylvania shot up over the past few years as companies expanded their use of fracking. The Marcellus Shale is about 5,000 feet underground in Pennsylvania, separated by thick rock layers from water aquifers, which are at most a few hundred feet down.

Still, the surge in fracking has been accompanied by a spurt in complaints from homeowners who say their water has been contaminated, resulting in sick children, dead livestock and flammable tap water.

In Dimock, the EPA found that some residents had methane in their water at or more than 14 milligrams per liter -- double the Pennsylvania state safety level -- even as it issued a statement that the water was safe to drink. The U.S. doesn't set a limit on the gas's level, as the agency says methane doesn't impair the smell or taste of water. It can be explosive.

Methane Amounts

Jackson was part of a four-person team from Durham, North Carolina-based Duke that first published research in the Proceedings of the National Academy of Sciences last year that said water wells found closer to gas drilling had greater amounts of methane. The isotopic characteristics of some of the gas in those wells were consistent with that of the Marcellus, they concluded.

Jackson's lab received \$50,000 from the Park Foundation, which has funded groups critical of oil and gas drilling, to conduct baseline testing of water in New York, which is considering lifting a de facto ban on fracking. That funding came after the initial Dimock research was completed, he said.

Cabot took issue with the Duke findings.

In a paper its scientists co-published with Lisa Molofsky, an environmental geologist at GSI Environmental Inc., an environmental-engineering consulting firm in Houston, they concluded that pre-drilling data from more than 1,700 water wells in Pennsylvania showed methane was naturally ubiquitous in shallow groundwater.

Isotopic Characteristics

They identified the isotopic characteristics that would differentiate Marcellus Shale gas from other so-called thermogenic gases, which are fossil fuels formed by pressure and heat underground, and concluded that the water wells in Dimock didn't have gas from the Marcellus, but from a shallower layer, the Middle and Upper Devonian. The assertion by the Duke study that hydraulic fracturing of the Marcellus Shale is contributing thermogenic methane to local water wells and shallow regional groundwater is unsubstantiated given the lines of evidence, Molofsky and her co-authors concluded in the December paper published in *Oil & Gas Journal*.

To reach that finding, Molofsky established a range of isotopic values, or the ratio of heavier to lighter carbon, and heavier to lighter hydrogen molecules in the gas, which the researchers wrote provide valuable geochemical fingerprinting tools.

In the recently published EPA samples from Dimock, two households had methane that fell within that range. Three others had values nearby.

Results Disputed

Neither Cabot nor Molofsky is convinced.

Molofsky said that the structure of the molecules shows evidence of oxidation, which could allow a shallower-origin gas to appear to be from the Marcellus. She has now moved to analyze the isotopic signatures of the methane along with that of ethane, another component of natural gas. That evidence, which hasn't been published yet, shows the gas in homeowner wells is not from the Marcellus formation, she said in an interview.

The vast array of data that we have analyzed does not show a match for Marcellus Shale gas in Dimock, Cabot spokesman George Stark said in an interview.

Seeping Gas

If it is Marcellus gas, how did it get in the water wells? Jackson hypothesizes that the steel casings used to keep wells from leaking failed, allowing Marcellus gas to seep out. In the other wells that show evidence of shallower gas, cement lining the wells may not have been installed correctly, providing a pathway for gas to migrate, he said. The results could be an indication of more contamination to follow.

If it's Marcellus, and a problem with casing or even hydraulic fracturing, is it only a matter of time before other things show up? Jackson said in an e-mail, referring to the chemicals used in fracking. That's what I would worry about if I lived there.

Industry geologists counter that even if it's Marcellus gas, it could have arrived in the aquifer via natural channels and not because of drilling.

This doesn't tell us anything about the travel time, John Conrad, a hydrogeologist at Conrad Geoscience Corp. in Poughkeepsie, New York, said in an interview. More likely than not the gas migrated over millions of years.

Pennsylvania Scientist

Fred Baldassare was a hydro-geologist at the Pennsylvania Department of Environmental Protection who analyzed the isotopes of methane in Dimock when the state began investigating homeowners complaints in 2009.

He is neither convinced by the new EPA data, which he said is too limited to make a conclusion, nor the denials by Cabot. The methane the EPA sampled could have changed over time, and without earlier results from those same wells, they aren't conclusive, he said.

Still, he said, earlier evidence that he analyzed was conclusive.

The molecular and isotopic evidence I saw was that the gas in the water supply looked like the gas in the Cabot gas wells, Baldassare, who now runs his own water testing firm called Echelon Applied Geoscience Consulting in Murrysville, Pennsylvania, said in an interview.

It's doing more damage than good to keep denying that connection, he said: Let's get past that.

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